

Application No.: 10/065,678

Docket No.: JCLA9038

In The Drawing

Please amend FIG. 1 by replacing with the "Replacement Sheet", in which the clock 104 is at the receiving end.

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JUL 25 2006Present Status of the Application

The Office Action rejected claims 1-17. Specifically, claims 3, 4, 13, and 17 are rejected under 35 U.S.C. 112, first paragraph. In addition, claims 1-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (U.S. Patent 4,453,259) in view of Funderburk et al. (IEEE publication; hereinafter Funderburk). Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Funderburk and Lee et al. (Digital Communication; hereinafter Lee). Applicants have amended claims, specification and drawings. Claims 1-4, 7-9, and 11-17 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Claim Objections

Claims 1-3 and 5 are objected due to the space between the words. Applicants have looked into claims 1-3 and 5 and cannot find the situation stated by the Office Action. The space between the words is not there. Therefore, Applicants presently do not amend claims with respect to this objection.

Discussion of Claim Rejections under 35 USC 112

Claims 3, 4, 13, and 17 are rejected under 35 U.S.C. 112, first paragraph. Applicants respectfully traverse the rejections for at least the reasons set forth below.

1. With respect to claims 3 and 13, the timing tracking process by itself is a known process, which can base on the interpolated signal, detected data or a pilot signal to analyze out the desired time consisting with the clock used in the transmitting end ([0020]). Therefore,

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Applicants believed that the feature itself recited in claim 3 and 13 can be understood by the ordinary skilled artisans function. Applicants provide references that were published prior to the filing date of the present application to prove that those skilled in the art were able to access the references to know how a timing tracking process is performed.

(1) The process of the timing tracking based on the digital data content from the data detector can be found in the following paper, of which Figure 1 and 2 show the timing tracking based on diction output.

Jui-Yuan Lin and Che-Ho Wei, "Adaptive Nonlinear Decision Feedback Equalization with Channel Estimation and Timing Recovery in Digital Magnetic Recording Systems," IEEE Transactions on Circuit and Systems-II : Analog and Digital Signal Processing, vol. 42, No. 3, pp. 196-206.

(2) The process of the timing tracking based on pilot signal can be found in C.-M. Chang and K.-C. Chen, "Reversalink pilot-tones aided synchronization in DS-CDMA communication system," in *Proc. IEEE GLOBECOM*, Nov. 1998, pp. 2992-2997.

2. With respect to claim 4, the features are at least described in paragraphs [0008], [0009], [0010], [0023], [0024], [0025], and [0029]. Particularly, timing tracking unit can dynamically retain the coefficient of the channel impulse response when the interpolation point has changed. Due to this operation together between the timing tracking process with the information of the estimated channel impulse response in the step of estimating the channel impulse response, the set of coefficients is updated. Because of this way of the present invention, the interpolator can

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be simplified by using small number of interpolation filter coefficients. Applicants provide reference that was published prior to the filing date of the present application to prove that those skilled in the art were able to access the reference to know how a timing tracking process is performed.

The timing tracking process uses the channel impulse response can be found in K.H. Mueller and M. Muller, "Timing recovery in digital synchronous data receivers," *IEEE Trans. on Communications.*, vol. 24, pp. 516-531, May 1976.

3. With respect to claim 17, in order to more easily to determine the interpolation point in timing tracking unit 208, the way recited in claim 17 is a usual way and can be understood by the ordinary skilled artisans.

J. Bao et al. describe how interpolator divides the sampling clock interval into a number of sub-intervals and how the closest interpolation point is selected from the sub-intervals.

J. Bao, C. Y. Lu, P. Da Graca, S. Zeng, and T. Poon, "A new timing recovery method for DTV receiver," *IEEE Transactions on Consumer Electronics*, vol. 44, No. 4, pp. 1243 - 1249 , Nov. 1998.

4. It should be noted that the references provided as the IDS are just for showing the processes themselves which are known by the ordinary skill artisans. The foregoing references does not disclose the full features as recited in dependent claims 3, 4, 13, and 17 with the features recited in independent claims.

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Discussion of Claim Rejections under 35 USC 103

Claims 1-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Funderburk. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Funderburk and Lee. Applicants have amended independent claims 1 and 8. Applicants respectfully traverse the rejections for at least the reasons set forth below.

1. With respect to amended independent claims 1 and 8, the timing tracking process is temporarily paused for a time period during normal timing tracking while the channel estimator performs the retraining process. In the present application, after the interpolation points are changed, the timing tracking process is temporarily paused and the channel estimator performs a retraining process.

2. In re Miller, the Office Action has referred to several elements 56, 58 and 86 with the descriptions to reject the present invention. Applicants respectfully disagree.

In Fig. 3, the elements 56, 58 and 66 are not operated in the same way of the present invention (col. 5, lines 10-22). The modem 66 checks whether or not the sampled data is synchronous with the baud rate, so as to advance or retard the samples input to the modem 66. The circuit 66a is connected to the up-down counter 86 by the line 70 and functions to increment or decrement the counter depending on the state of signal on line 70 (col. 5, lines 29-32).

Miller failed to disclose the features of the present invention by considering timing tracking process with estimating the channel impulse response, in which the coefficients of the channel impulse response is updated and used in timing tracking process and detecting the data.

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Miller further failed to disclose the features that while performing the retraining process, the timing tracking process optionally is temporarily paused.

3. In addition to above discussions, the Office Action has also noted that Miller does not disclose the obtaining the channel impulse response and using the interpolated signal and channel impulse response to detect the digital data. Funderburk is then further cited by the Office Action for combination.

However, Applicants have to state that Funderburk does not modify Miller into the present invention.

Funderburk is based on the Nyquist filter (p.615, right column, second paragraph). The timing control algorithm is based on equalizer tap gains (page 615, section III). Funderburk discloses the timing control algorithm different from the present invention.

Particularly, Funderburk does not temporarily pause the timing control during normal timing tracking. Actually, Funderburk does not attempt timing control in the first 200 symbol intervals (page 616, left column, lines 1-11).

4. Further consideration, since the algorithm of Miller is different from both the present invention and Funderburk, the combination for Miller with Funderburk is not proper, either.

5. With respect to claim 14, the Office Action further cites Lee in combination for rejections. However, claim 14 depends on independent claim 8 and carries the features recited in independent claim 8. Lee only discloses the Nyquist rate. However, Lee does not provide the missing features in Miller with Funderburk for independent claim 8.

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6. It should be noted that dependent claims 4 and 12 of the present invention further define the present invention over the prior art references.

For at least the foregoing reasons, Applicants respectfully submit that independent claims 1 and 8 patentably define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-4, 7, 9, 11-17 patentably define over the prior art references as well.

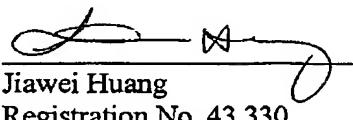
CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-4, 7-9, 11-17 of the invention patentably define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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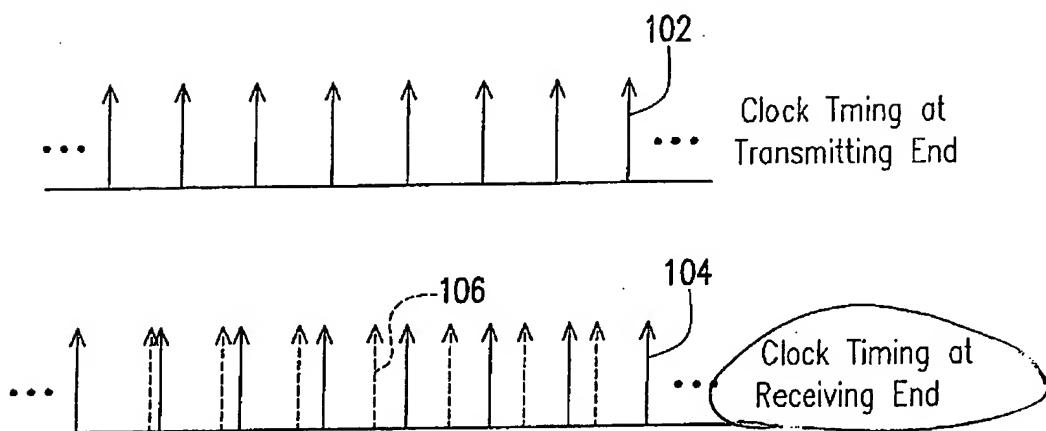
Annotated Marked-up drawing

FIG. 1